

# **ELECTROSTATIC VALVES FOR MICROFLUIDIC DEVICES**

## **I ABSTRACT OF THE DISCLOSURE**

Valve structures formed in elastomer material are electrostatically actuated  
5 by applying voltage to a flexible, electrically conductive wire pattern. An actuation force  
generated between the patterned wire structure and an electrode result in closure of a flow  
channel formed in elastomer material underlying the wire. In one embodiment of a valve  
structure in accordance with the present invention, the wire structure is patterned by  
lithography and etching of a copper/polyimide laminate, with an underlying gold plate  
10 positioned on the opposite side of the flow channel serving as an electrode. In an  
alternative embodiment, a first wire structure is patterned by physically cutting out a first  
pattern of strips from an Aluminum/MYLAR(R) laminate sheet. A second patterned wire  
structure serving as the electrode is formed by the same method, and positioned on the  
opposite side of a control channel. Application of an actuation force between the first and  
15 second patterned strips closes the control channel and an associated flow channel  
underlying the control channel.